

## CLAIMS

What is claimed is:

1. A method comprising:  
5 accessing a computer program;  
automatically identifying a set of one or more attributes of the computer  
program with values that are to be input to the computer program by a user; and  
outputting an identification of the set of one or more attributes.

10 2. A method as recited in claim 1, wherein outputting the  
identification comprises generating a list including the set of one or more  
attributes and outputting the list.

15 3. A method as recited in claim 1, wherein outputting the  
identification comprises creating one or more forms including selected ones of  
the set of one or more attributes.

4. A method as recited in claim 3, wherein the one or more forms  
comprises one or more HyperText Markup Language (HTML) pages.

20 5. A method as recited in claim 3, wherein the one or more forms  
comprises one or more eXtensible Markup Language (XML) pages.

25 6. A method as recited in claim 3, wherein creating the one or more  
forms comprises generating a form definition for each form by:  
identifying the selected one or more attributes to include on the form;  
creating a data input field for the form definition via which a user can  
subsequently input a value for the attribute; and

creating a submit tag for the form definition via which the user can subsequently input a request to submit the values on the form to the computer program.

5           7.     A method as recited in claim 3, wherein the computer program includes a plurality of interactions that each include one or more command definitions and one or more view definitions, wherein each command definition defines a command having various attributes and a behavior, wherein each view definition defines a view that is a response to a request, and wherein the  
10     creating comprises creating one form for each of the plurality of interactions.

8.     A method as recited in claim 1, further comprising:  
identifying a set of one or more outputs of the computer program; and  
outputting the set of one or more outputs.

15           9.     A method as recited in claim 8, wherein outputting the set of one or more outputs comprises generating a list including the set of one or more outputs and outputting the list.

20           10.    A method as recited in claim 8, wherein outputting the set of one or more outputs comprises creating one or more forms including selected ones of the set of one or more outputs.

11. A method as recited in claim 1, wherein the computer program includes a plurality of interactions that each include one or more command definitions and one or more view definitions, wherein each command definition defines a command having various attributes and a behavior, and wherein each  
5 view definition defines a view that is a response to a request; and

wherein the automatically identifying comprises,

identifying, for each of the command definitions of each of the plurality of interactions, the methods of the command definition,

checking, for each identified method that sets a value, whether a  
10 corresponding identified method obtains the value, and

identifying, as an attribute of the set of one or more attributes, each attribute corresponding to a method that sets a value for the attribute for which there is no corresponding identified method that obtains the value for the attribute.

12. A method as recited in claim 11, wherein identifying the methods of the command definition comprises querying the command definition to cause the command definition to identify its own methods.

13. A method as recited in claim 11, further comprising identifying one or more additional attributes that are not obtained by the computer program from elsewhere and that cannot be input by the user.

14. A method comprising:  
25 accessing a computer program;  
automatically identifying a set of one or more outputs of the computer program; and  
outputting an identification of the set of one or more outputs.

15. A method as recited in claim 14, further comprising:  
automatically identifying a set of one or more attributes of the computer  
program with values that are to be input to the computer program by a user; and  
5 outputting an identification of the set of one or more attributes.

16. A method as recited in claim 14, wherein outputting the  
identification of the set of one or more outputs comprises generating a list  
identifying the set of one or more outputs and outputting the list.

17. A method as recited in claim 14, wherein outputting the  
identification of the set of one or more outputs comprises creating one or more  
forms including selected ones of the set of one or more outputs.

18. A method as recited in claim 14, wherein the computer program  
includes a plurality of interactions that each include one or more view  
definitions, wherein each view definition defines a view that is a response to a  
request; and

wherein the automatically identifying comprises,

identifying, for each of the view definitions of each of the  
plurality of interactions, the methods of the view definition,

identifying, as one of the set of one or more outputs, each output  
included in one of the identified methods.

19. A method as recited in claim 14, wherein the computer program includes a plurality of interactions that each include one or more command definitions and one or more view definitions, wherein each command definition defines a command having various attributes and a behavior, wherein each view  
5 definition defines a view that is a response to a request, wherein the outputting comprises creating a form for each of the plurality of interactions, and wherein each form includes one or more outputs for the corresponding one of the plurality of interactions.

10 20. A system comprising:  
a query control module configured to access a business logic and obtain an indication of a plurality of methods used by the business logic; and  
a test module configured to analyze the plurality of methods and identify, based on the analysis, a group of one or more attributes with values set  
15 by user inputs to the business logic.

21. A system as recited in claim 20, further comprising a filter module configured to:  
receive an indication of the plurality of methods used by the business  
20 logic;  
identify a group of the plurality of methods, wherein each method in the group stores an attribute value or loads an attribute value; and  
forward an indication of only the plurality of methods in the group to the test module as the plurality of methods to be analyzed by the test module.

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22. A system as recited in claim 20, further comprising a form creation module to create, based on the group of one or more attributes identified by the test module, one or more forms including selected ones of the group of one or more attributes.

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23. A system as recited in claim 22, wherein the form creation module is further configured to create the one or more forms by generating a form definition for each form by:

identifying the selected one or more attributes to include on the form;

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creating a data input field for the form definition via which a user can subsequently input a value for the attribute; and

creating a submit tag for the form definition via which the user can subsequently input a request to submit the values on the form to the business logic.

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24. A system as recited in claim 20, wherein the test module is further configured to output a list including the group of one or more attributes.

25. A system as recited in claim 20, wherein the test module is further configured to:

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identify a set of one or more outputs of the business logic; and  
output the set of one or more outputs.

26. A system as recited in claim 25, wherein the test module is further configured to output the set of one or more outputs by generating a list including the set of one or more outputs and outputting the list.

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27. A system as recited in claim 25, wherein the test module is further configured to output the set of one or more outputs by creating one or more forms including selected ones of the set of one or more outputs.

5 28. A system as recited in claim 20, wherein the business logic includes a plurality of interactions that each include one or more command definitions and one or more view definitions, wherein each command definition defines a command having various attributes and a behavior, and wherein each view definition defines a view that is a response to a request; and

10 wherein the query control module is further configured to obtain the indication of the plurality of methods used by the business logic by querying each of the command definitions of each of the plurality of interactions for the methods of the command definition.

15 29. A system as recited in claim 20, wherein the test module is further configured to identify, based on the analysis of the plurality of methods, one or more additional attributes that are not obtained by the business logic from elsewhere and that cannot be input by a user.

20 30. One or more computer-readable media comprising computer-executable instructions that, when executed, direct a processor to generate a plurality of input forms and output forms for a computer program by:

accessing the computer program to identify operations in the computer program that load attribute values and set attribute values;

25 analyzing the identified operations to determine one or more user inputs to the computer program;

automatically generating one or more input forms to allow a user to input at least some of the one or more user inputs;

accessing the computer program to identify one or more outputs of the computer program; and

automatically generating one or more output forms to present the outputs of the computer program.

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31. One or more computer-readable media as recited in claim 30, wherein the computer-executable instructions further direct the processor to:

generate a list identifying the one or more user inputs to the computer program and another list identifying the one or more outputs of the computer program; and

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output the lists.

32. One or more computer-readable media as recited in claim 30, wherein generating the one or more input forms comprises generating a form definition for each form by:

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identifying the selected one or more user inputs to include on the form;

creating data input fields for the form definition via which a user can subsequently input a value for the user inputs; and

creating a submit tag for the form definition via which the user can subsequently input a request to submit the values on the form to the computer program.

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33. One or more computer-readable media as recited in claim 30, wherein the computer program includes a plurality of interactions that each include one or more command definitions and one or more view definitions, wherein each command definition defines a command having various attributes  
5 and a behavior, and wherein each view definition defines a view that is a response to a request; and

wherein accessing the computer program to identifying operations in the computer program that load attribute values and set attribute values, and analyzing the identified operations,

10 identifying, for each of the command definitions of each of the plurality of interactions, the methods of the command definition,

checking, for each identified method that sets a value, whether a corresponding identified method obtains the value, and

15 identifying, as one of the one or more user inputs, each attribute corresponding to a method that sets a value for the attribute for which there is no corresponding identified method that obtains the value for the attribute.

20 34. One or more computer-readable media as recited in claim 30, wherein the computer-executable instructions further direct the processor to identify one or more attributes of the computer program that are not obtained by the computer program from elsewhere and that cannot be user inputs.

25 35. A testing system to test a computer program, the testing system comprising:

a query control module configured to identify one or more methods used by the computer program to load attribute values and set attribute values;

a test module configured to identify whether any of the attributes values are set by the computer program prior to being loaded by the computer program, and indicate an error in the computer program if both one or more attribute values are set by the computer program prior to being loaded by the computer program and if the one or more attribute values cannot be input by a user via an input form.

36. A system as recited in claim 35, wherein the computer program includes a plurality of interactions that each include one or more command definitions and one or more view definitions, wherein each command definition defines a command having various attributes and a behavior, and wherein each view definition defines a view that is a response to a request; and

wherein the query control module is further configured to obtain the indication of the plurality of methods used by the computer program by querying each of the command definitions of each of the plurality of interactions for the methods of the command definition.